Speaking cosmically, Vredevoort II is a dust mote, but for all that we have mass with a capital M. Specific gravity 8, volume 4 cubic kilometers. The mass works out at $8\times4\times(100{,}000)^3$ grams. 3.2×10^{16} grams. Over 35 thousand million tons.

It sounds, and is, a considerable hunk of matter, but Hermes, Eros, Icarus, all asteroids penetrating the inner Solar System as they orbit, are all distinctly larger.

We will steer the 35 billion ton missile into mid-ocean at 50 kilometers per second. Our observation eyrie will have to be well out and well to the side. There is no foretelling the speed and coherence at which the jet of plasma will gush up from the impact flare. Three or four thousand miles *may* be safety distance.

At the end of the countdown, a tremendous glare of sheer violet radiance—a color few have witnessed outside the high energy labs—lights the ocean for four hundred miles round the target, throwing the tiny clouds into vivid relief. It lasts only the space of two heartbeats, leaving us dazzled, far away as we are. That is not the impact—that is incandescent air! Air so compressed when Vredevoort II rushes through it on the last lap to the ground as to glow in the violet, and beyond. Luckily, we are not placed to hear the sonic boom which accompanies the glow; at closer range the sound is such as to pulverize bone and homogenize living tissue.

Before our eyes recover, there is another, more brilliant flare of violet. The plasma-bolt is rocketing up into space. Even at this range, it flames too brightly to be watched, brighter and hotter by far than the surface of the sun. Here is a concentration of naked energy verging into the nuclear range. We are seeing it by the lower frequencies; most of the radiation is beyond the visible spectrum. Before it disperses and cools, the jet of stripped atoms travels so fast and climbs so high, that it seems to stand upon the ocean hundreds of miles tall—an incandescent column, rainbow tipped and haloed. This is perhaps the illusion of persistence of vision, but its glare lights the entire ocean from continent to continent.

Below it, the fireball is expanding. First it is a blue-hot pinprick, then a dazzling sun-white speck, of perceptible breadth even before the plasma bolt has cooled to invisibility. It grows as a roiling, incandescent chaos, which even the eye

of the imagination finds difficult to penetrate. In its lurid glare, we see a faint ripple expanding across the cloudscape. From our distance, it moves at a seeming snail's pace, though its real speed is little short of Mach 1.

Our mental experiment will take us little further; only calculation will clarify the processes which follow the flare.

Since $e=\frac{1}{2}mv^2$, every gram of the meteorite's mass will carry: $\frac{1}{2}\times1\times(5\times10^6)^2$ ergs. This works out to 1.25×10^{13} ergs per gram. Now multiply this by the total weight, 3.2×10^{16} grams. The total energy comes to 4×10^{29} ergs. This is very nearly *ten teratons, or ten million megatons of TNT.* (A megaton of TNT yields "only" 4.2×10^{22} ergs.) For comparison, the largest earthquakes which have been measured since Milne invented the seismograph developed less than 10^{27} ergs; this power was spread over very great volumes of the Earth's crust and mantle.

We could express the energy as heat. A calorie is the heat needed to raise the temperature of a gram of water by 1° C. It equals 42 million ergs. So our experimental strike is going to produce 10^{22} calories. There is power enough, and to spare. What other effects follow those violet flares?

To begin with, the enormous heat of the impact will not only vaporize the mile or two depth of ocean at the bull's eye, it will also vaporize the crystal rocks below, clear through the Moho, and blow out the surrounding rocks as well. Beyond the area where the mantle is laid bare, rifts will expose hot magma.

The crater is as wide as Vredevoort in South Africa. Though more power is absorbed in producing plasma at the kernel of the event than in a land strike—fearful energy is needed to convert water into a plasma of hydrogen and oxygen nuclei—water *is* less dense than rock. Despite its incompressibility and high latent heat of evaporation, it is easier to shift en masse than rock. So although the seabed crater is somewhat shallower than that on land, it is just as broad. A blazing wound scores of miles wide scars the sea floor.

A ringed waterfall as high as the Alleghenies rushes in to quench it, its circumference that of a county boundary. The fiery furnace opened by this strike will *not* glow for weeks and months as it would on land; the torrents of ocean rush in, and change at once to pure steam. They stream up in a thin-walled sleeve which is as clear as air, as invisible as the gush